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Project Title

Synthesis of Systemic Functional Theory & Dynamical Systems Theory for Socio-Cultural Modeling

1. Overview

The overall research plan of this project is to apply methods and principles of dynamical systems theory (DST) to base data derived from systemic functional theory (SFT) analysis of text and multimedia resources, with the aim to identify and track evolving patterns, in particular those related to stability and instability. The goal of the project is to develop theory and algorithms, and demonstrate their validity and potential with case studies.

In this first stage of the project, the goal was to perform detailed SFT analysis of sample texts to provide test-case base data for DST analysis. SFT case studies include online discourses about global financial crisis and climate change. For case studies concerning climate change, a particular focus is on events occurring around

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14. ABSTRACT
The overall research plan of this multiyear project is to apply methods and principles of dynamical systems theory (DST) to base data derived from systemic functional theory (SFT) analysis of text and multimedia resources, with the aim to identify and track evolving patterns, in particular those related to stability and instability. The goal of the project is to develop theory and algorithms, and demonstrate their validity and potential with case studies. Progress toward that goal, including reports of six case studies. What has emerged from analyses available to date is essentially the confluence of particular linguistic choices with respect to content and text production.

15. SUBJECT TERMS

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the time of the United Nations Copenhagen Climate Change Summit 2009 (COP15) which took place in Copenhagen, Denmark on 7-18 December 2009. In parallel with the gathering of SFT base data has been the development of software tools for manipulation, analysis, and visualisation of the base data.

The analysis of SFT base data mapped the 'landscape' on which the dynamics of the text plays out. This mapping of the landscape involved visualisation and understanding the distribution of information of high dimensionality. Standard mathematical methods of mapping were applied, such as principle component analysis, local linear embedding, recurrence analysis, and clustering. These preliminary experiments were designed to determine both the identifying features of the texts and what existing mapping methods are most useful, before developing new techniques for capturing the dynamics of the text in the second phase of the project. At present, work is under way to develop the DST analysis and tools on the extended SFT base data with the aim of revealing dynamics of meaning making in discourse.

Research output has been three conference presentations [8, 9, 10], a paper submitted to a linguistics journal [5], a book chapter [6], and a Master's thesis [7]. The application of the mathematical visualisation tools on the base data in the Masters thesis provided interesting analytical insights which are currently being written up as further journal submissions.

There are no problems and issues concerning ethics as the project uses only publicly available resources and anonymous public comments.

2. Activities of Personnel

Kay O'Halloran provides expert knowledge for assessing the strategic direction for the DST analysis. She oversees the SFT analysis of the case studies and supervises Research Assistant Marissa E and Masters student Loh Boon Liang. In addition, she is responsible for administration of the grant and negotiations with NUS. Kay O'Halloran presented work on the project during her plenary talk at the 6th Annual Conference of the Latin American Systemic-Functional Linguistics Association (ALSFAL) in Fortaleza, Brazil on 7-9 October 2010 [10].

Kevin Judd has developed the software tools for SFT analysis and visualisation, and the tools for the mathematical analysis and visualisation methods. Kevin Judd works closely with other members of the research team in order to develop an understanding of SFT and how to best apply mathematical analysis techniques to the SFT base data.

Marissa E is the Research Assistant who undertakes the SFT analysis of texts and applies the analysis and visualisation tools and techniques. Marissa has a Masters Degree in English Language Studies in the Department of English Language & Literature NUS with a focus on SFT. Marissa gave a conference paper on the results of her analysis at the 36th International Systemic Functional Congress (ISFC09) at Tsinghua University Beijing China on 14-18 July 2009 [8] and she presented a paper on recent findings with Kay O'Halloran at the Fifth International Conference on Multimodality (5ICOM) at the University of Technology Sydney on 1-3 December 2010 [9].

Loh Boon Liang, a postgraduate student who recently completed his Masters Degree in the Department of English Language & Literature NUS, undertook detailed SFT analyses of an on-line CNN article on the global financial crisis for his Masters project. Boon Liang has an Honours degree in physics, and he has also applied some of the preliminary DST analyses. Boon gave a conference paper on the results of his research at the 36th International Systemic Functional Congress (ISFC09) at Tsinghua University Beijing China on 14-18 July 2009 [8].

3. Theory, Analytical Tools and Methods

Systemic Functional Theory (SFT)

The key terms in Systemic Functional Theory (SFT) are *systemic* and *functional*. That is, language and other resources (e.g. images and sound resources) are conceptualised as inter-locking systems of meaning which realise four functions. That is, the systems are used to (a) construct our ideas about the world (experiential meaning), (b) establish logical relations (logical meaning), and (c) enact social relations which create a stance towards the ideas which are expressed (interpersonal meaning). These three 'metafunctions' are enabled through textual meaning, the

fourth metafunction concerned with the organisation of the message.

Comprehensive descriptions of the grammatical systems and structures for the four metafunctions (experiential, logical, interpersonal and textual) are provided according to hierarchical ranks and strata (e.g. sounds, word groups, clauses, and complex discourse structures in language, and elements, figures and episodes in images). This provides a conceptual framework for analysing ideas and informational content (configurations of agents, participants, processes and circumstances), the social relations which are established (power, status and affect), the orientation to the ideas which are presented (modality and truth value), and the ways in which the choices are organised to achieve specific purposes (e.g. points of departure, given and new information).

The systemic functional descriptions of the grammatical systems and structures are semantic in nature, thus providing a powerful tool for mapping the meaning potential of resources as sets of inter-related systems, and for analysing the meaning arising from the actual choices made in the text. SFT provides a means for bridging the 'semantic gap' which exists between the text and its meaning. In addition, the metafunctional principle provides an integrating platform for describing how language and other resources (e.g. images and sound) work together to fulfil particular objectives.

While there are alternative approaches to study texts and generate and extract essential data for mathematical analysis, SFT is chosen because:

(1) In this approach, language is conceptualised as systems of meanings, accompanied by forms through which those meanings are realized in text. As such, SFT is designed to account for how language is used, and it provides tools for the interpretation of (a) the underlying linguistic systems, (b) the elements of linguistic structure, and (c) the text itself.

(2) Linguistic choices are explained by reference to their function in the total linguistic system, resulting in a comprehensive description of essential information in the data extraction process. The systemic functional model

includes system choices for:

(a) Content plane (word, word group, clause, clause complex and paragraph)

(b) Expression plane (phonology, typography and graphology)

(c) Context plane for register (field: what the text is about; tenor: the types of social relations; mode: spoken/written) and genre (text type).

(3) Systemic functional analysis reveals subtle shifts across four strands of meaning (experiential meaning, logical reasoning, interpersonal orientation and textual organization). Configurations of processes, participants and circumstance (i.e. happenings involving agents, actors and other participants) and logical reasoning about those configurations are analysed. The representations are conceptualised as interactive events between 'speakers' where information and goods and services are exchanged. The textual organisation of the linguistic elements reveals the points of departure, and given and new information.

(4) The systemic functional model has been extended to resources other than language to provide a unified approach to data analysis so that extracted information includes the co-contextualising or re-contextualising meanings arising from the interaction between linguistic, visual and aural resources.

Systemics Software

The main tool for creating the SFT base-data is the Systemics software. This software was originally developed by Kay O'Halloran and Kevin Judd in 1999-2002 for research and teaching in SFT. The original Systemics software provided a cross-platform GUI application for SFT annotation of text at the rank of word group, clause, clause complex, and discourse. These annotations are stored in a database. The software provided basic search functions based on tag count frequencies. The Systemics software has been extensively revised and extended for this project by adding new annotation features, more sophisticated search features, and scientific visualisation techniques. The new annotation features allow better analysis of embedded clause structures, discourse chains and lexical items.

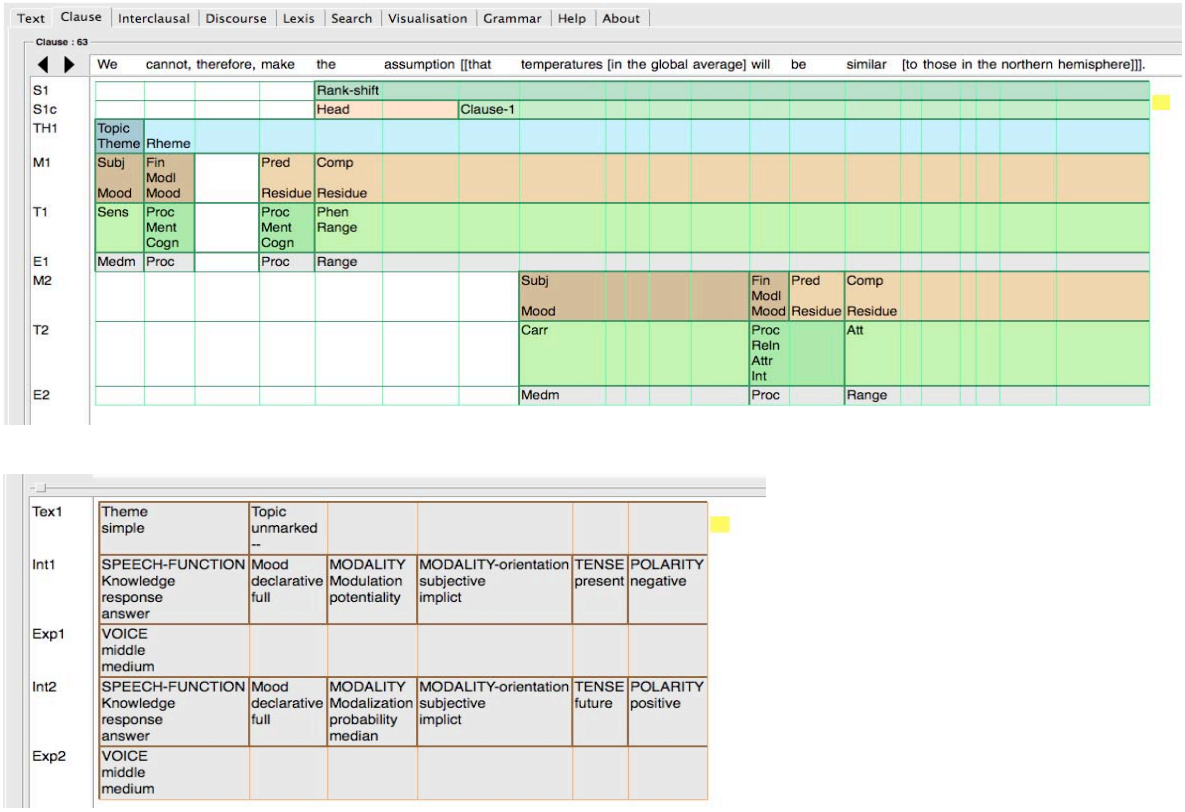

Figure 1(a). SFT Clause Annotation

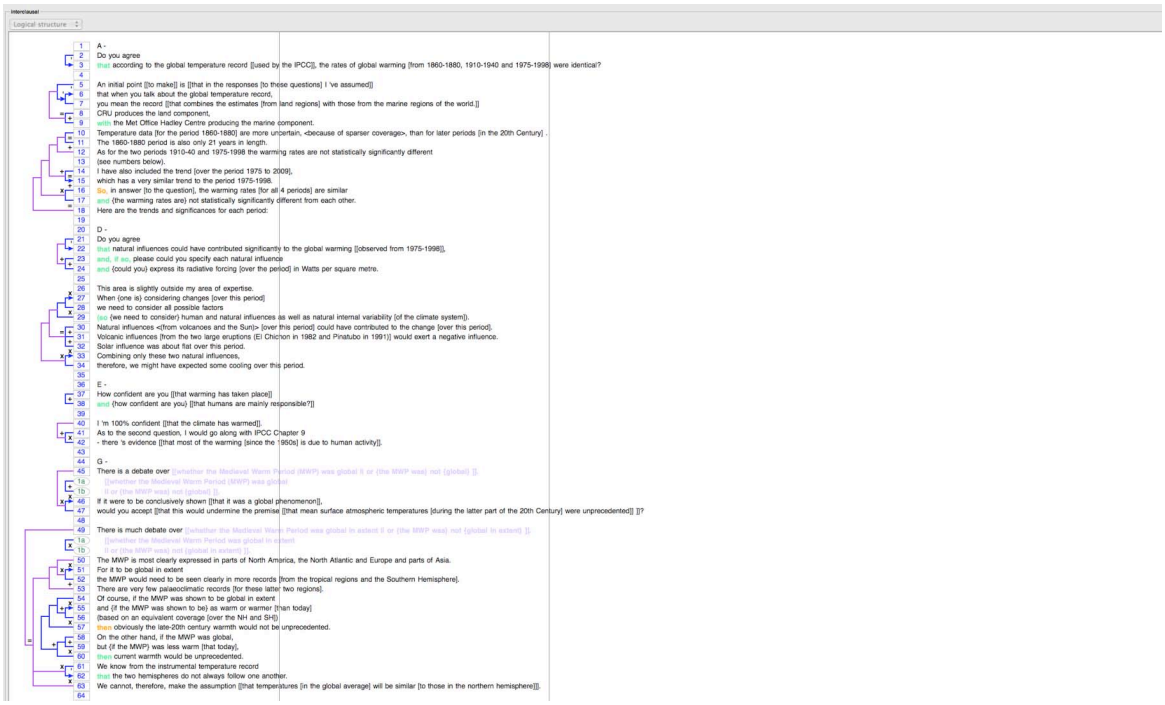

Figure 1(b). SFT Clause Complex Annotation

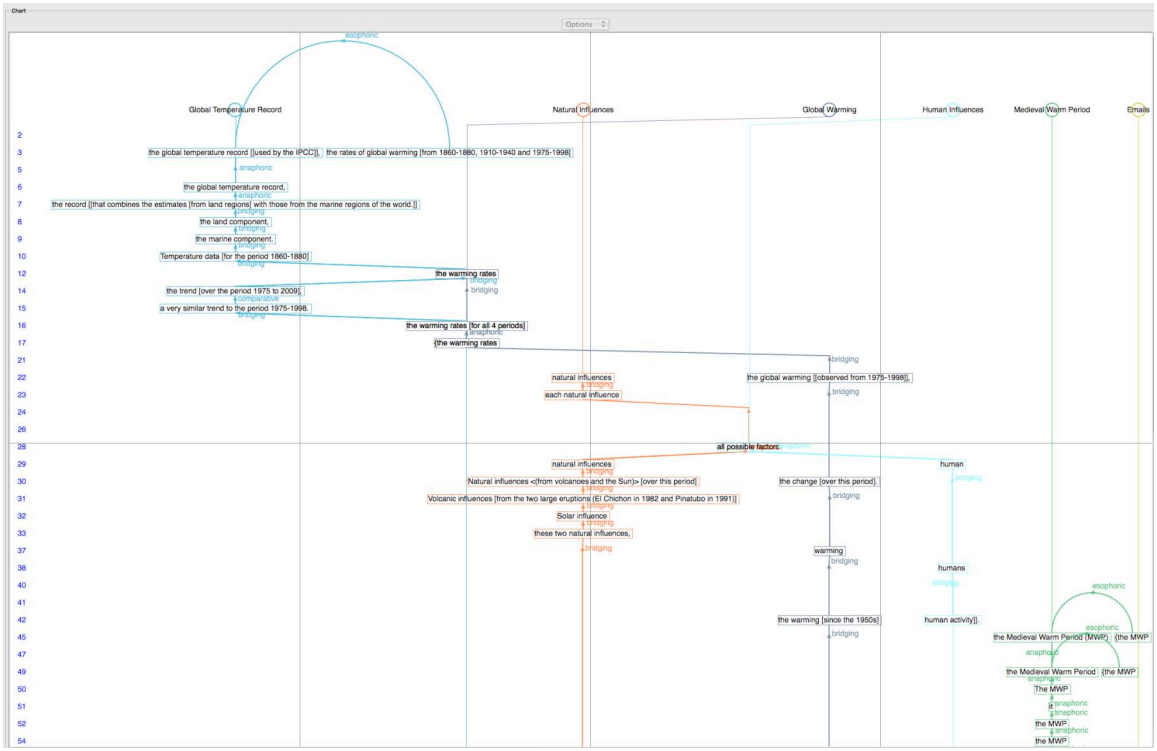

Figure 1(c). SFT Discourse Annotation

The new search features in Systemics include word-tag concordances, complex pattern-matching, and complex logical relations of tags across systems and different databases. The visualisation features combine a number of mathematical techniques for feature extraction, correlation analysis and cluster analysis.

Mathematical Analysis and Visualisation of SFT Base-data

The aim of the mathematical analysis is to reveal and understand how meaning is being made in texts, in particular the dynamic accumulation of meaning as the text unfolds. The SFT annotations of the text provide an extensive decomposition of the text into functional elements, typically word groups. The meaning potential of these functional elements is multidimensional in the sense that each element plays a role in the different SFT systems. This results in a complex data structure, where the text is decomposed in word groups, which are further grouped into larger and larger groups which are analysed multiple times according to their metafunctional roles. The data structure includes annotations that are attribute tags attached to each element, or group, where the attribute tags are options drawn from the hierarchically organised

SFT systems.

One of the projections of this data structure we have extensively explored is clause-tag associations, which can be conveniently represented as a binary matrix. In this matrix representation each row is associated with a clause, each column is associated with a tag, so tags are attached to the corresponding clause and vice versa. In this data projection the text is represented as a cloud of points in a dual vector space, the clause-space and tag-space, corresponding to the row and column spaces of the binary matrix. The text can be investigated through examination of the dual space, for example, using singular value decomposition (SVD) and clustering techniques. The features of the text are visualised using various network diagrams and by projection of the features back onto the text using colour tints and font attributes. The various visual renderings are transformations and filterings of the underlying data structure.

One of the key innovations of our work is that many of the qualitative aspects of meaning making in a text previously described by Halliday (1978, 1994), Halliday and, Matthiessen (2004), Martin (1992) and others, can be associated with quantifiable aspects of our data structures. For example, qualitative features can be identified with reference points in the clause-tag dual-space. The degree to which a text possesses a feature can be described in terms of barycentric coordinates with respect to predefined reference points and metrics. The dynamics of the unfolding meaning in a text can be quantified by the path of the text in clause-space as described by the barycentric coordinates. We have also examined the dynamics of texts in terms of the accumulation of quantitative measures over the logical structure of the text (Figure 2), and by state machines derived from projection and clustering of the underlying data structure (Figure 3). One of the key advantages of our quantitative description of the meaning making in texts is that it enables comparative analysis of texts, and the identification of features of a text that deviate from genre norms (Figure 4). In addition, it is possible to interpret covert messages (experiential, logical, interpersonal and textual) which are not immediately apparent.

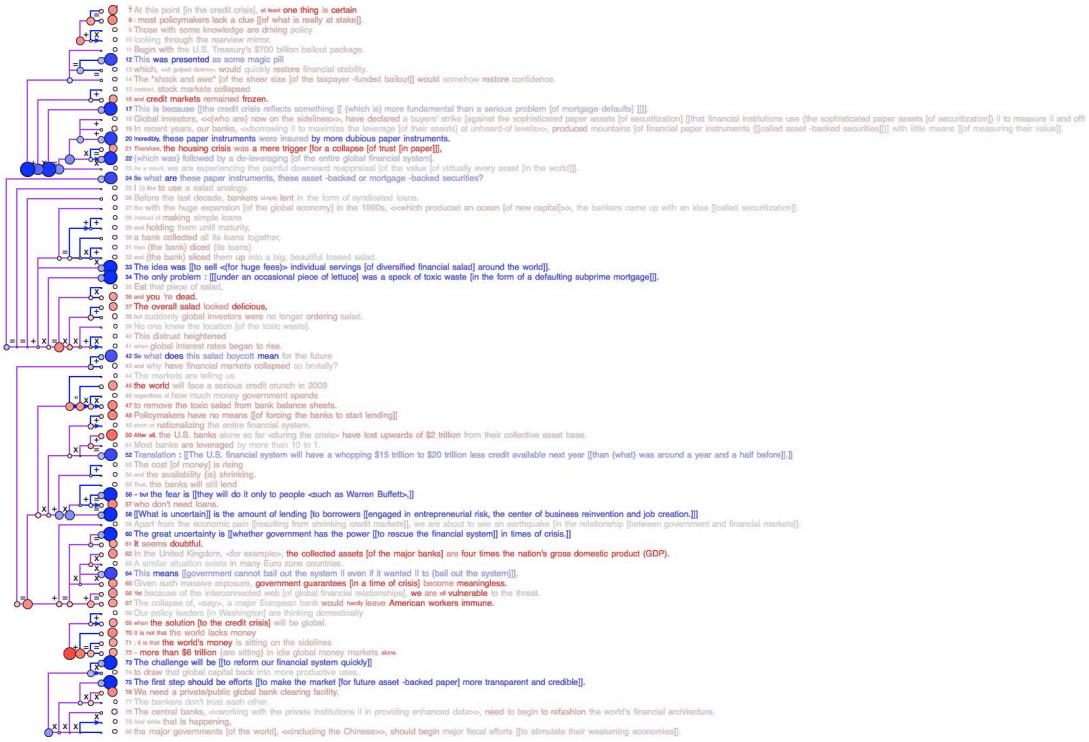

Figure 2. Accumulation of features over logical structure

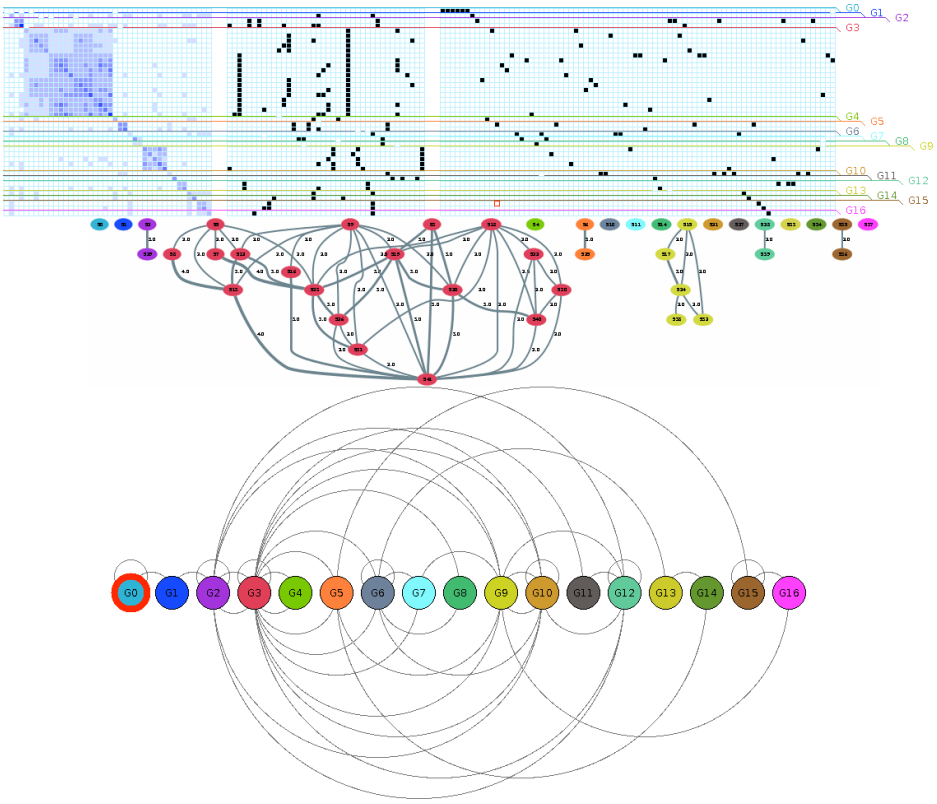

Figure 3. A state machine based on clustering in dual-space

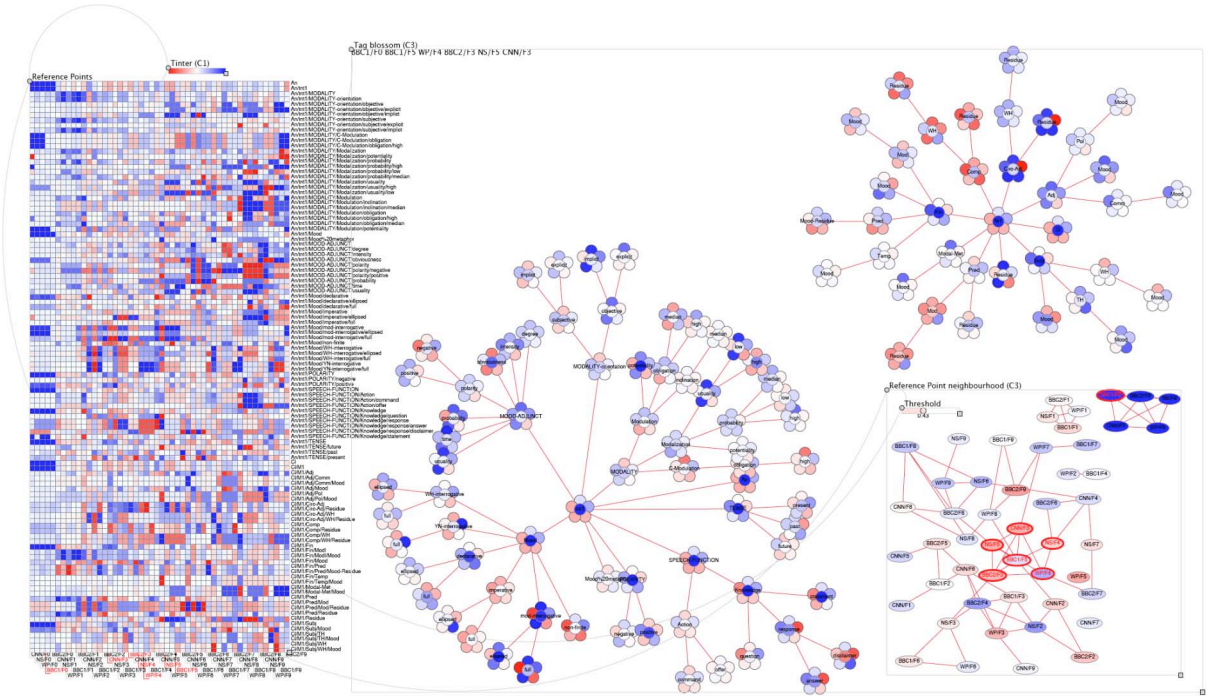

Figure 4. An interactive visualisation comparing the features of six texts

4. Case Studies

There were six case studies selected for analysis. Case Study 1 is concerned with a financial advisor's view of the global financial crisis which unfolded in 2008, while Case Studies 2 – 6 are from a corpus of texts on climate change which focus on events surrounding the United Nations Copenhagen Climate Change Summit 2009 (COP15) in Copenhagen, Denmark on 7-18 December 2009. Our initial analysis of the texts reveals significant differences in how the resources of language are employed to communicate information and influence readers. Subtle effects may, for example, cause readers to misunderstand cogent information (e.g. the reliability of climate models).

The six case studies are briefly described below. Detailed results of the analysis for these case studies are found in the Appendix.

Case Study 1

Title: 'Commentary: Why there is a crisis – and how to stop it'

Author: David Smick

Source: *CNN News*
http://edition.cnn.com/2008/POLITICS/10/09/smick.crisis/index.html
Date: 10 October 2008
Type: Website

The financial advisor presents his views regarding the origins of the global financial crisis and what needs to be done in order to restore the situation. The analysis reveals that although on the surface the text appears to present an objective view of the financial crisis, there are multiple underlying strategies where the author uses a range of linguistic resources (particularly modality and transitivity systems) in a metaphorical fashion to present himself an authority with knowledge of both the causes and solutions to the global financial crisis.

Case Study 2
Title: 'Are climate scientists over-selling their models?'
Author: Fred Pearce
Source: *New Scientist*
http://www.newscientist.com/article/mg20026851.900-are-climate-scientists-overselling-their-models.html?full=true
Date: 4 December 2009
Type: Website

Professor Lenny Smith, a climate scientist at the London School of Economics, is interviewed regarding the usefulness of climate models for forecasting climate and weather patterns. The analysis reveals how this scientist constantly qualifies his statements about the usefulness of climate models through the use of congruent modality resources (e.g. Finite elements, Mood Adjuncts), unlike the global financial advisor in Case Study 1 who uses metaphorical resources to achieve a high level of apparent certainty.

Case Study 3
Title: 'Hackers target leading climate research unit'
Author: BBC News Online
Source: *BBC News*

http://news.bbc.co.uk/2/hi/8370282.stm
Date: 20 November 2009
Type: Website

The *BBC News Online* text is a news report on the email hacking incident that occurred at the Climatic Research Unit at the University of East Anglia in November 2009, just before the United Nations conference on climate change (COP15) in Copenhagen. This text was one of the first news reports on the incident to emerge and frames the event as a breach of IT security. The analysis of this text reveals that the text producers reconstruct the event in terms of a theft of information (i.e. a burglary), which functions to subordinate the controversy regarding claims of data manipulation. The focus of the article is directed towards security measures at the university, rather than the researchers working in the Climatic Research Unit.

Case Study 4
Title: 'Hackers steal electronic data from top climate research center'
Author: Juliet Eilperin
Source: *The Washington Post*
http://www.washingtonpost.com/wp-dyn/content/article/2009/11/20/AR2009112004093.html
Date: 21 November 2009
Type: Website

The Washington Post text also reports on the email hacking incident that occurred at the Climatic Research Unit at the University of East Anglia. The analysis reveals that this text frames the email hacking event in a different way to Case Study 3. That is, the reporting hinges on the controversy arising from the event and it positions climate change proponents and climate change sceptics as opposing parties, with the proponents being presented as defensive and the sceptics as objective and confident.

Case Study 5
Title: 'Q&A: Professor Phil Jones'
Author: Roger Harrabin
Source: *BBC News*

http://news.bbc.co.uk/2/hi/8511670.stm
Date: 13 February 2010
Type: Website

Roger Harrabin, one of the world's most senior environment and science journalists, interviews Professor Phil Jones, who was head of the Climatic Research Unit at the University of East Anglia in Britain when the email hacking incident occurred. In the interview, Mr Harrabin engages Professor Jones on several points which arose as a result of the controversy – including the use of the word 'trick' and the accusations that the science behind global warming is not as strong as climate scientists have argued it to be. The preliminary analysis reveals how the scientist tends to use relational processes to describe particular states, without drawing upon interpersonal resources to make explicit evaluations of those states.

Case Study 6
Title: 'Phil Jones momentous Q&A with BBC reopens the "science is settled" issues'
Author: Indur M. Goklany
Source: *Watts Up with That*
http://wattsupwiththat.com/2010/02/14/phil-jones-momentous-qa-with-bbc-reopens-the-science-is-settled-issues/
Date: 14 February 2010
Type: Website

The text is a blog entry from the well-known climate change blog *Watts Up with That,* managed by Anthony Watts, an American broadcast meteorologist. The text was written by a guest writer, Indur M. Goklany. Preliminary analyses suggests that the 'scientific' discourses underlying arguments from climate change proponents and climate change denialists rely on different meaning-making strategies, resulting in different effects. Case Study 6 emphasises interpersonal meanings of uncertainty and doubt, especially through its lexis, and this stands in contrast with Case Study 5 which is centrally concerned with ideational content.

Rationale for Case Studies 1-6

Case Studies 1-6 are concerned with events of significance. Case Study 1 deals with a financial expert, David Smick's view on the global financial crisis, while Case Studies 2 – 6 are part of a corpus of texts concerned with the reporting of climate change in the media. As with any event of significance, there is an on-going evolution of the construction of the event, from its initial point of occurrence, which is itself often difficult to identify. This process of evolution is continuous, complex and dynamic, involving interactions between the content of the communication, the different modes of communication, and the variable factors of people and context. As the event unfolds, various individuals from different backgrounds with different agendas make attempts to make sense of the event in relation to the values and beliefs that they hold, for the purpose of constructing certain realities and reinforcing or rejecting valuations of the realities that are constructed by themselves and others.

In light of such processes of evolution, we have chosen issues of the financial crisis and climate change for this project. The reporting of the financial crisis has a shorter span of evolution compared climate change which has been the subject of discussion for decades. Both issues are currently being reported, however within an environment where there is a basic distrust of the different interest groups and mainstream institutions (e.g. banks).

Our texts have been selected with an awareness of the socio-cultural complexity, global importance and on-going evolution of these two events. Each text is only a small fragment of the event as it unfolds, a single capture of a never-ending sequence of interactions. However, despite its finite character, each text is a window through which each event is viewed, an attempt to make sense of what is happening, to engage with the reality that is perceived. Furthermore, the seemingly single instance of the text as an engagement with reality does not occur in isolation or for its own sake. Such an instance arises out of other previous instances, which in turn provokes other instances, a phenomenon called intertextuality. The complex interconnectivity and interdependency of instances is shown in our selection of case studies. Each of these texts offers the reader the option of sharing the text with others via email, and social media platforms like Facebook and Twitter. In addition, five out of six of our texts

have provisions for readers to submit comments in response to the text, and many of these comments also spontaneously set up discussions on topics that may or may not be of relevance to the original text.

In addition, these texts have been selected based on the potential for comparison with other texts. For example, Case Studies 5 and 6 were selected because each text provided insights into the framing of expert opinion of a particular scientist or analyst in the field. A second example, Case Study 3 and 4, were selected in order to examine how two different texts in two different news websites reported on the same event. Finally, for Case Studies 1 and 2, these texts were chosen to see how experts from two different domains, one of science and another of economics and finance, make use of linguistic choices to achieve their communicative intent.

5. Summary of Main Achievements

The main achievements have been to map the landscape of texts in terms of key textual features in preparation for capturing the dynamics in terms of experiential meaning (i.e. participants, processes and circumstances), logical meaning (logical relations within those constructions), interpersonal meaning (truth value attached to statements and the appraisal of the content) and textual meaning (in terms of composition). This mapping of the landscape involved visualisation and understanding the distribution of information of high dimensionality using principle component analysis, local linear embedding, state machines, recurrence analysis, and clustering.

One of the key innovations of our work is that many of the qualitative aspects of meaning making in a text can be associated with quantifiable aspects of our data structures. We have also examined the dynamics of texts in terms of the accumulation of quantitative measures over the logical structure of the text, and by state machines derived from projection and clustering of the underlying data structure. One of the key advantages of our quantitative description of the meaning making in texts is that it enables comparative analysis of texts, and the identification of features of a text that deviate from genre norms, or reveal convert messages that are not always obvious.

Future plans include developing the DST analysis and tools on the extended SFT base data with the aim of revealing dynamics of meaning making in multimodal discourse. Online discourses about climate change, particularly those in relation to the United Nations Copenhagen Climate Change Summit 2009 (COP15) which took place in Copenhagen, Denmark on 7-18 December 2009, have been chosen for analysis (text, image and video).

Department of Defence benefits include an effective means for detecting, analysing and discourse strategies in text and multimedia resources through which people and interest groups position themselves and create potential instabilities in ways which are not always immediately apparent.

6. References

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[10] O'Halloran, K. L. *Critical Multimodal Discourse Studies.* Plenary address. 6th Annual Conference of the Latin American Systemic-Functional Linguistics Association (ALSFAL). Universidade Estadual Do Ceara (UECE) Brazil on 7-9 October 2010.

APPENDIX

Case Study 1

Title: 'Why there is a crisis and what to do about it"

Author: David Smick

Source: http://articles.cnn.com/2008-10-09/politics/smick.crisis_1_salad-global-investors-financial-markets?_s=PM:POLITICS

Date: 9 October 2008

Type: Website

Overview:

This text is an opinion piece written by financial advisor, David Smick for CNN.com. Smick writes about what he perceives are the origins of the financial crisis and what should be done in order to resolve it.

Analysis:

Various perspectives were adopted in order to map the characteristics of this text. The annotation and analysis reveal the linguistic patterns and strategies which the author uses; for example, grammatical metaphors and repetition of certain lexicogrammatical choices result in the different phases evident in the visualizations of the text. Grammatical metaphors are structural rather than lexical transformations, the latter being more typical of the conventional understanding of metaphor. The grammatical metaphors construct the global financial crisis as an abstract metaphorical concept embedded within a complex of logically related events. The analysis reveals how patterns of metafunctional choices are aligned with logical relations.

Conclusion:

The devastation caused by the financial crisis at both the individual and societal levels led to accusations and numerous attempts to explanation the causes and reasons for the events which unfolded. This article is an example of such explanation, where the author employs various linguistic strategies to convince readers that this particular conceptualization should be valued above others. To achieve this communicative purpose, the writer combines interpersonal and experiential resources in a repeated and predictable fashion, leading to analytical techniques which may be used to detect

patterns in other texts which use similar metaphorical forms of expression.

Case Study 2

Title: Are climate scientists over-selling their models?

Author: Fred Pearce

Source: http://www.newscientist.com/article/mg20026851.900-are-climate-scientists-overselling-their-models.html?full=true

Date: 4 December 2008

Type: Website

Overview:

This interview report documents Professor Lenny Smith's responses to questions relating to the usefulness of climate models for forecasting climate and weather patterns. In the article, Professor Smith makes a claim for the usefulness of climate models, as long as their results are not over-interpreted. The published interview is a modified transcript of the actual interview that took place, revised by Professor Smith. In addition, the editorial team at *New Scientist* included a photo of Professor Smith from a photo session for the article.

Analysis:

The analysis reveals Professor Smith's careful management of interpersonal resources, particularly with respect to expressions of modality which are concerned with probability, usuality, obligation, inclination and potentiality. Congruent expressions of probability, obligation and potentiality meanings are used (e.g. might, could, would, must). Thus, Professor Smith carefully negotiates the discussion of climate models, revealing a sensitivity to both the reporting of climate change in the media and the strategic alliance of different interest groups. Professor Smith manages the different viewpoints without compromising clarity of his message.

In terms of ideational meaning, the visualization tools show that the relational attributive intensive process type is the most significant process type in this text. Relational attributive processes relate a participant or entity X to an attribute Y. Since this process type is the most frequent in the text, there is therefore some evidence that the lexicogrammatical choices Professor Smith makes in terms of ideational meaning

are those that allow him to define a participant or entity as having particular attributes, in this case for making reference to the different attributes of climate science models.

In terms of the sequential development of ideational meaning, this text also shows us how certain transitivity processes cluster together. In this particular text, there is a clustering of relational attributive processes as one group, and a clustering of material/mental/relational identifying processes as another group. Further data analysis is necessary to reveal the significance of such clustering patterns across other texts.

Finally, the interaction of visual and verbal modes revealed an interesting disjunction where the carefully managed verbal meaning was in a sense 'hijacked' by visual meanings realised by the image. Evidence for this disjunction was found in the comments section where readers focused especially on the sub-text of the image as similar to images of Jesus Christ.

Conclusion:

In summary, this text was useful as base data for the initial set of visualizations. 'Hot spots' of activity for interpersonal and the ideational meanings were observed which form the basis for further developments of the visualization tools. In addition, evidence of disjunction between the visual and verbal modes signals the need for visualisation capabilities which take into account both types of semiotic modes.

Case Study 3

Title: Hackers target leading climate research unit
Author: No author stated (BBC News)
Source: http://news.bbc.co.uk/2/hi/8370282.stm
Date: 20 November 2009
Type: Website

Overview:

This news report covers the email hacking incident which occurred at the Climate Research Unit (CRU) at the University of East Anglia (UEA) in November 2009. The report takes the form of a recount, followed by an interview with an IT security expert

on his views regarding the incident.

Analysis:

The main feature is the division of the text into two halves. The division is evidenced by the different metafunctional choices that occur in each half of the text. The analysis focuses on the frequency of occurrence of verbal group elements: i.e. Finite/Mood, Finite/Predicator/Mood choices and Predicator/Residue choices. While the frequency of occurrence of Finite/Predicator remained the same in both halves of the text, the Fin/Mood + Pred/Residue featured in the first half and the Fin/Modl/Mood + Pred/Residue featured in the second half. This indicates an increasing shift to modality when the IT expert is interviewed.

In terms of content, this shift in modality marks the division into a recount section and an interview section. The logical structure visualization also reveals different patterns in the first and second half of the text. Similarly, ideational meaning gives further evidence for this division of a text. In the first half of the text, material and verbal processes outnumber both relational attributive and relational identifying processes. The opposite pattern is observed in the second half of the text.

The analysis provides clear evidence how metafunctional choices combine in particular patterns, this case interpersonal, logical and experiential choices correlate with different text types. Thus, from different perspectives of the text, evidence is available to distinguish content and text type (i.e. recount and exposition).

Conclusion:

It is evident that sub-texts with different combinations of metafunctional choices exist within texts. This corresponds to the findings in Case Study 2, where changes in content correlate with changes in metafunctional choices.

Case Study 4

Title: Hackers steal electronic data from top climate research center

Author: Juliet Eilperin

Source: http://www.washingtonpost.com/wp-dyn/content/article/2009/11/20/AR2009112004093.html

Date: 21 November 2009
Type: Website

Overview:
This article is also a news report about the email hacking incident which occurred at the Climate Research Unit (CRU) at the University of East Anglia (UEA). It was chosen as a possible contrastive text to Case Study 3 since, in addition to the recount portion of the text, the second half features quotes from the climate change scientists directly involved in the controversy and a well-known climate change denialist.

Analysis:
The analysis reveals how modality resources can be used to one's advantage or disadvantage. Compared to Case Study 3, this text expresses modality in a different way – through Mood Adjuncts rather than the Finite/Mood. In this text, the debate between Mr Myron Ebell and Professor Michael Mann is the case in point. Professor Mann uses one instance of modality, the underlined Mood Adjunct 'hardly':

"It is <u>hardly</u> anything you would call a "trick"."

Mr Ebell uses also one instance of modality, the interpersonal Modal Metaphor 'It is clear', which has been underlined in the example below:

"<u>It is clear</u> that some of the 'world's leading climate scientists', <<as they are always described>>, are more dedicated [[to promoting the alarmist political agenda than in scientific research]],"

The effects of such usage for both men are different. For Professor Mann, because this instance of modality comes after a series of clauses which attempt to explain the "trick" but fail to because of a series of ambiguous declarative statements, the effect is one of sweeping away the controversy rather than addressing it.

In contrast, Mr Ebell's use of modality is effective because it takes place within a context of situation where the declarative statements he makes merely reiterates what has been said by others. The burden of proving his case is not on him. As such, the

use of “It is clear” with its high modality value serves to reinforce his statements.

The *Washington Post* text differs in other respects from the *BBC News* report. For example, the *Washington Post* demonstrates more variety in terms of the participants and entities in the Subject position, and lexical verb usage.

The Subject position is crucial in English since it is the focus of the clause and the participant to which the Finite element is attached. The *Washington Post* text contains ‘hackers’ and ‘skeptics’ in Subject position, together with multiple mentions of ‘emails’ and the term ‘the stolen items’. The *BBC News* text, however, avoids mentioning these participants, giving a different slant to the event. It appears that in the BBC News text, the focus is not on a protagonist/antagonist paradigm, as in the *Washington Post*, but on a more traditional factual recount.

Conclusion:

In summary, the management of metafunctional resources is integral to the meaning that is communicated, and this is tied to the context in which text operates. In this case, the BBC News text and the *Washington Post* reveal semantic differences that reflect different communicative intent.

Case Study 5

Title: Q&A: Professor Phil Jones
Author: Roger Harrabin
Source: http://news.bbc.co.uk/2/hi/8511670.stm
Date: 13 February 2010
Type: Website

Overview:

This text is taken from the online site of *BBC News*, and it is an interview of Professor Phil Jones, the re-instated head of the Climate Research Unit (CRU) at the University of East Anglia (UEA), conducted by climate and environment journalist Roger Harrabin. In this text, Professor Jones answers questions regarding the science of global warming and also addresses issues arising from the email hacking incident.

Analysis:

Preliminary analysis indicates that this text would be potentially useful as a micro-text to understand the dynamics of scientific discourse. Moreover, the text functions as a response to the email hacking incident which led to Professor Jones' resignation from the CRU. The text provides insights into how an expert scientist (as one type of social actor in the discourse space) positions himself to restore and possibly enhance his professional reputation.

Conclusion:

Conclusions will be formed after a more in-depth study of the text has been done.

Case Study 6

Title: Phil Jones momentous Q&A with BBC reopens the "science is settled" issues

Author: Indur M. Goklany

Source: http://wattsupwiththat.com/2010/02/14/phil-jones-momentous-qa-with-bbc-reopens-the-science-is-settled-issues/

Date: 14 February 2010

Type: Website

Overview:

This text is an entry on a well-known climate change blog called *Watts Up With That.* It consists of entries written by Anthony Watts, an American broadcast meteorologist, who is known to be sympathetic to climate change denialists and guest writers.

Analysis:

Analysis on this text is still pending.

Conclusion:

Conclusions will be formed after further analysis of the text has been completed.

Note:

The annotated texts in Case Studies 5 and 6 are in the process of being analyzed. The reason for their selection is because one is an interview with one of the scientists directly involved in the controversial incident, and the other is a response to the same

interview on a popular blogsite which is known for its climate denialist views. The purpose is to explore how the context of situation and communicative intent influence the management of metafunctional resources. At present, there appear to be similarities seen between Case Studies 2 and 5, possibly because both texts involve scientists discussing issues about climate science. However, further analysis will need to be done before any conclusions can be made.

Summary Findings of Case Studies

To date, all six texts reported here have been annotated. Case Studies 1 to 4 have been analyzed and examined in detail with Case Studies 5 and 6 remaining to be analyzed. What emerges from the analysis available at present is essentially the confluence of particular linguistic choices with respect to content and text production.

In Case Study 1, the findings show usage of linguistic resources to achieve meanings related to a particular conceptualization of the origins of the financial crisis. The use of textual, interpersonal and experiential elements help to prioritize information and meanings which the author thinks is crucial towards understanding the financial crisis. In addition, such usage also reveals characteristics of argumentation and style which may be idiosyncratic, though this can only be ascertained by analyzing other texts written by the same author.

In Case Study 2, the use of modality and relational processes are significant. These two features are characteristic of scientific discourse, which aims to manage certainty, and to make clear and accurate statements about the natural physical environment. However, in this text, modality is not used only to manage certainty, but to also manage the interpersonal aspect of the communication with the audience. The linguistic choices take into account the readership of the text as an alternate ‘voice’.

In Case Study 3, lexicogrammatical choices co-vary such that the first half of the text shows a pattern of lexicogrammatical choices (interpersonal, experiential and logical) which is different to the second half, leading to a division of the text into recount and exposition sections. This occurs at both the interpersonal and transitivity strata, reflecting changes in mode, tenor and field. However, at this stage, we have not yet

developed techniques to map discoursal elements like tenor and field. The development of these techniques is key to understanding more about the communication of meaning between interactants in a particular communicative context and has been prioritized as the next stage of our research process.

Case Study 4 stands in comparison to Case Study 3, since both are news reports on the same event – the email hacking incident at the University of East Anglia. However, each report has re-contextualized the same event differently. Case Study 3 focuses on the event as a breach of IT security and positions the university as taking steps to deal with the situation in an assured manner. In comparison, Case Study 4 focuses on reporting the event as an indicator of the dissatisfaction of climate change skeptics with regards to the opinions and science of climate change proponents. The university involved is also portrayed differently, projecting an impression of uncertainty as it is cast as being 'aware' and being 'concerned', but unable to act. Like Case Study 3, the second half of the text is different. In Case Study 3, an IT expert has been interviewed, whereas in Case Study 4, a debate between climate change proponent and climate change skeptic has been set up by its text producer(s). The two sections of texts have different combinations of choices, for example, different expressions of modality that achieve different levels of certainty.

Case Studies 5 and 6 have yet to be examined in detail. However, they have been selected in order to show how meaning shifts from one instantiation of text to another which is motivated partially by it. A second objective would be to see if there are certain strategies used by climate change scientists and climate change skeptics which are particular to their discourse community.

Essentially, what our findings at present show is that discourse is indeed a social action which takes place within a social context. As such, there are broader implications for the findings we have stated here. Firstly, different understandings on the same event can motivate different reactions from those who are participating in that discourse. This is relevant to our objectives of understanding social trends and instability. Secondly, the ways in which participants enact their social roles is significant for understanding how these participants as a social group exert their power and influence amongst particular discourse communities, societies and cultures.